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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/017,325      | 12/14/2001  | Tomohiko Shibata     | 782_206             | 8198             |

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EXAMINER

IM, JUNGHWA M

ART UNIT PAPER NUMBER

2811

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                 |                |  |
|------------------------------|-----------------|----------------|--|
| <b>Office Action Summary</b> | Application No. | Applicant(s)   |  |
|                              | 10/017,325      | SHIBATA ET AL. |  |
|                              | Examiner        | Art Unit       |  |
|                              | Junghwa M. Im   | 2811           |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
     If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
     a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                 | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)        | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities. There are typological errors. The buffer layer "4" in paragraph 20 and the buffer layer "2" in paragraph 30 should be 3.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the Al content of the first semiconductor nitride is set 50 atomic percentages or over for all of the III elements. What is meant by Al content is set ... over "for all of the III elements"?

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-7 and 9-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Ohba (US 5990495).

Regarding claims 1 and 11-13, Fig. 6 of Ohba shows a light emitting semiconductor device comprising a sapphire substrate 10, an AlN layer 11 on the substrate, made of a first semiconductor nitride, the crystallinity of the AlN being set to 90 seconds or below in full width at half maximum of X-ray rocking curve (Abstract), a GaN layer 12 on the AlN made of a second semiconductor nitride, and a semiconductor layer group AlGaIn 13 on the GaN layer, made of a third semiconductor, the Al content of the third semiconductor nitride being set smaller than that of the first semiconductor nitride (col. 6, lines 46-50).

Note that the buffer layer 11 is an underlying layer (co. 2, line 13) and Applicant also discloses the same.

Regarding claims 3 and 4, insofar as understood, Ohba inherently shows that Al content of the first semiconductor nitride is set 50 atomic percentages or over since the AlN layer of Ohba has the same elements to that of instant invention while showing the same characteristics in FWHM of X-ray curve.

Regarding claims 5 and 6, Ohba teaches wherein the AlN layer is formed at 1100°C or over by a MOCVD method (col. 3, lines 54-68). In addition, "MOCVD" is a process designation, and would thus not carry patentable weight in this claim drawn to a product. See *In re Thorp*, 227 USPQ 964 (Fed. Cir. 1985).

Regarding claims 7 and 9, Ohba shows the thickness of the corresponding layers from

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Fig. 1-5.

Regarding claim 10, Fig. 2 of Ohba shows gradual reduction of Al contents.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being obvious over Ohba.

Regarding claim 2, Ohba does not explicitly teach that Ga content of the second semiconductor nitride is set not more than that of the third semiconductor nitride. However, Starting on col. 11, line 39, Ohba shows that compositions of the layer formed on the underlayer(buffer layer) can be arbitrary, especially teaching that AlGaInN layer (the same composition of the instant invention) on the underlayer(buffer layer) minimizing the crystal defect (col. 11, line 65-col. 112 line 3).

Regarding claim 8, Ohba does not explicitly teach the formation of the surface of the nitride layer of the substrate. However, Ohba discloses the nitrogen gas introduction into the surface of the substrate to grow the buffer layer (Applicant's underlayer) with the treatment preventing the dissociation of the nitrogen atoms from the crystal implying the nitride formation on the surface of the substrate.

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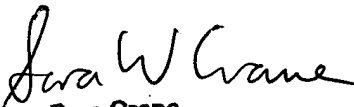
*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmi  
April 4, 2003

  
Sara Crane  
Primary Examiner